



Unmanned Underwater Vehicle-Neutralization (UUV-N) Project Overview for Industry Day

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UUV-N Mission Statement

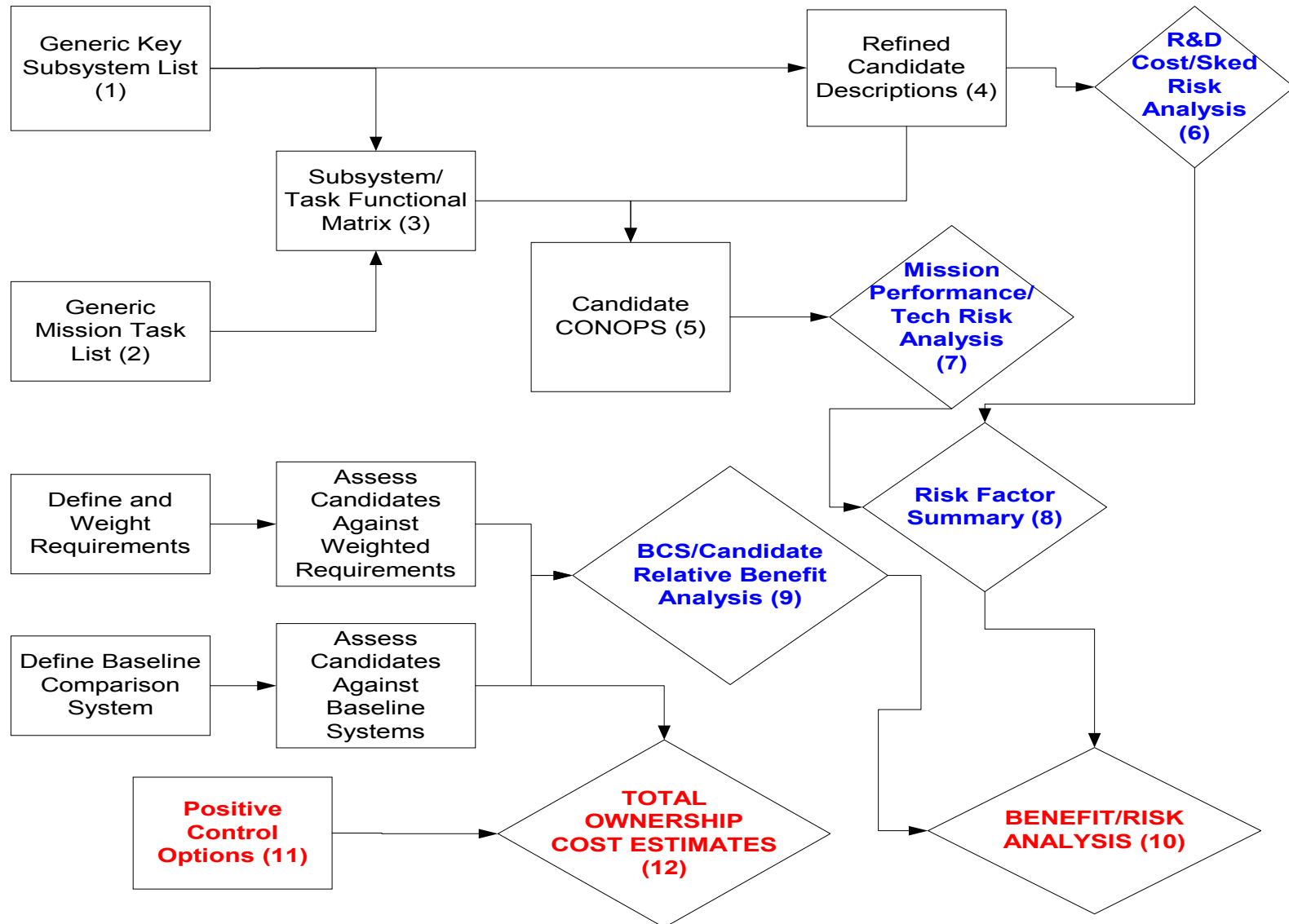
- Field a cost-effective unmanned neutralization capability that enables Very Shallow Water (VSW) neutralization by Naval Special Clearance Team-One (NSCT-1) UUV Platoon
- Advance force and pre-assault Mine Countermeasure (MCM) operations
- First generation UUV-N targets bottom & moored mines from safe standoff distance



Program Goals

- Field baseline capability ASAP and improve via subsequent spirals
- Suitability of the equipment solution for NSCT-1 is imperative
- Maintain awareness / leverage relevant unmanned neutralization efforts
 - Airborne Mine Neutralization System (AMNS)
 - Expendable Mine Neutralization System (EMNS)
- Solution should be a toolbox approach for NSCT-1

Analysis of Alternatives (AoA) Process Overview Diagram





Program Approach



- Analysis of Alternatives (AOA) process identified requirements and desirable candidates
- AoA evaluated: Low-Tech & Smart Crawlers, Swimming/Hovering Vehicles, Low-Tech & Smart Torpedoes
- AoA outcome:
 - Homing Torpedo offers best benefit/risk ratio
 - Crawlers have lowest technical risk for bottom mines

Program Approach (cont.)

- Alternatives Systems Review (ASR) used to down-select to baseline system
 - Expendable Torpedo system selected
 - Through water transit to target
 - Ability to prosecute bottom and moored targets
 - A system with both station keeping capability and the ability to transit long distances through water is highly desirable
- Future spirals based on operational need and predicted technology evolution

System Requirements

Table 2. UUV-N System Performance Goals

KPP	System Parameter	Threshold	Objective
X	Neutralization effectiveness [Note 1]	0.72	0.95
X	Reliability [Note 2]	0.90	0.95
	Vulnerability [Note 3]	Qualitative parameter, vulnerability characteristics must support mission accomplishment	
	Low Visibility	No continuous visible profile above the water surface	
	Station Keeping Time (SS3) [Note 4]	TBD	7 days
X	Interoperability [Note 5]	Qualitative parameter, interoperability characteristics must support mission accomplishment Interface with COIN	
	Command and Control [Note 6]	Remote command launch and/or enable functions	Remote launch/ enable commands and Operational feedback from UUV-N
	Portability/Deployability [Note 7]	2 men	2 men
X	Availability (A _o)* [Note 8]	0.85	0.95
	Compatibility with NSCT-1 Support Structure [Note 9]	Qualitative parameter, compatibility characteristics must support mission accomplishment	
	Maintainability (MCMTOMF) [Note 10]	5 hours	2 hours
	Target Types [Note 11]	All mines in VSW regime	All mines in VSW regime
	Sortie Combat Load [Note 12]	4 bottom mine neutralization charges*	8 bottom mine neutralization charges*
	Permissible On-Station Time [Note 13]	2.5 hours	15 to 30 minutes
	Compatibility with Physical Environment [Note 14]	See Table 4	

X Indicates key performance parameter

*** May change to include bottom and moored mines pending requirements revi**



Spiral 1 Requirements

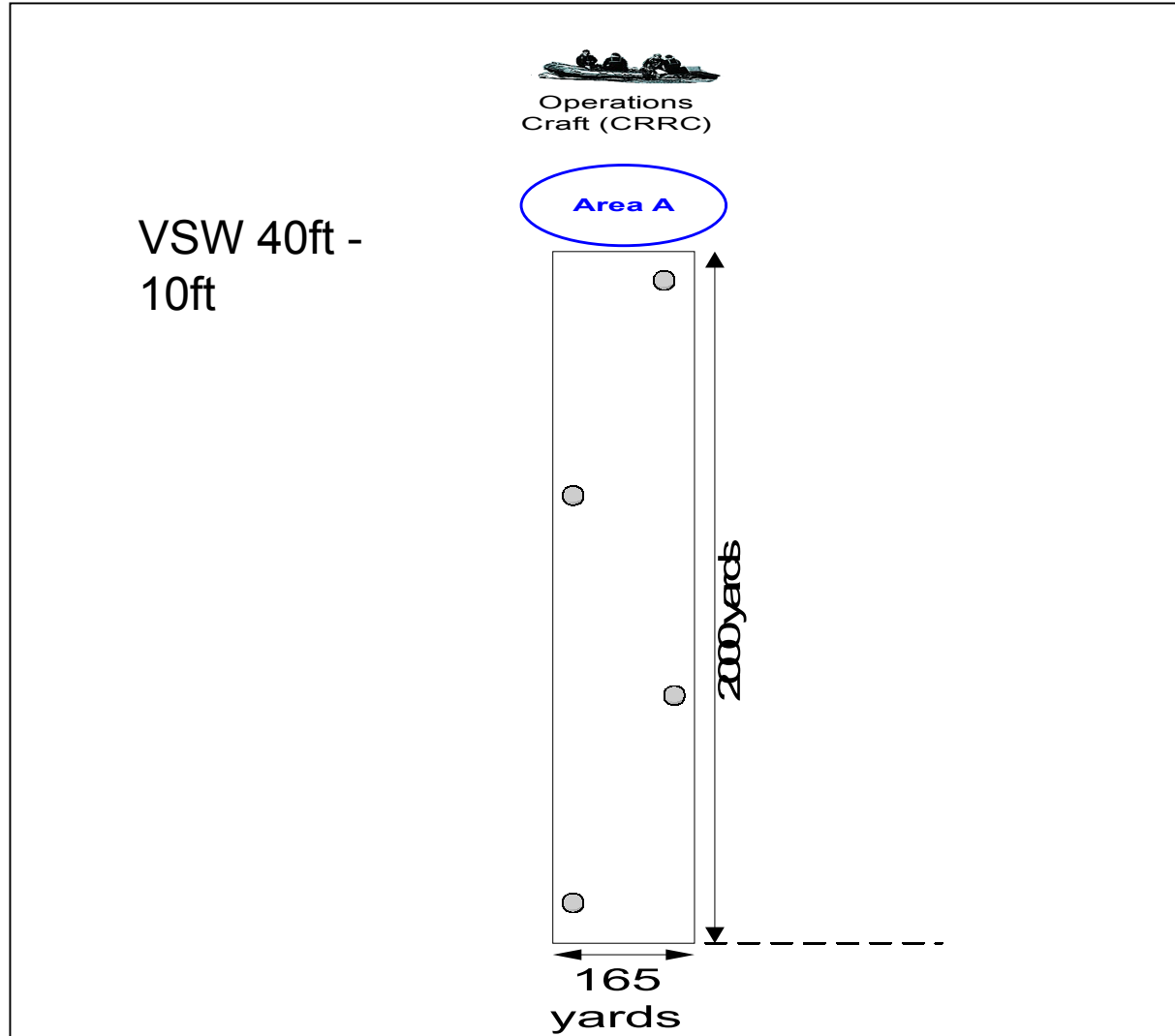


- Two-man deployment from small craft
- Able to locate mines in VSW hydrodynamic environment (surge)
- Neutralization Effectiveness depends on:
 - Precise re-acquisition of target
 - Precise placement of neutralization charge
 - Command detonation.
- Min 2000 yds from target to operator

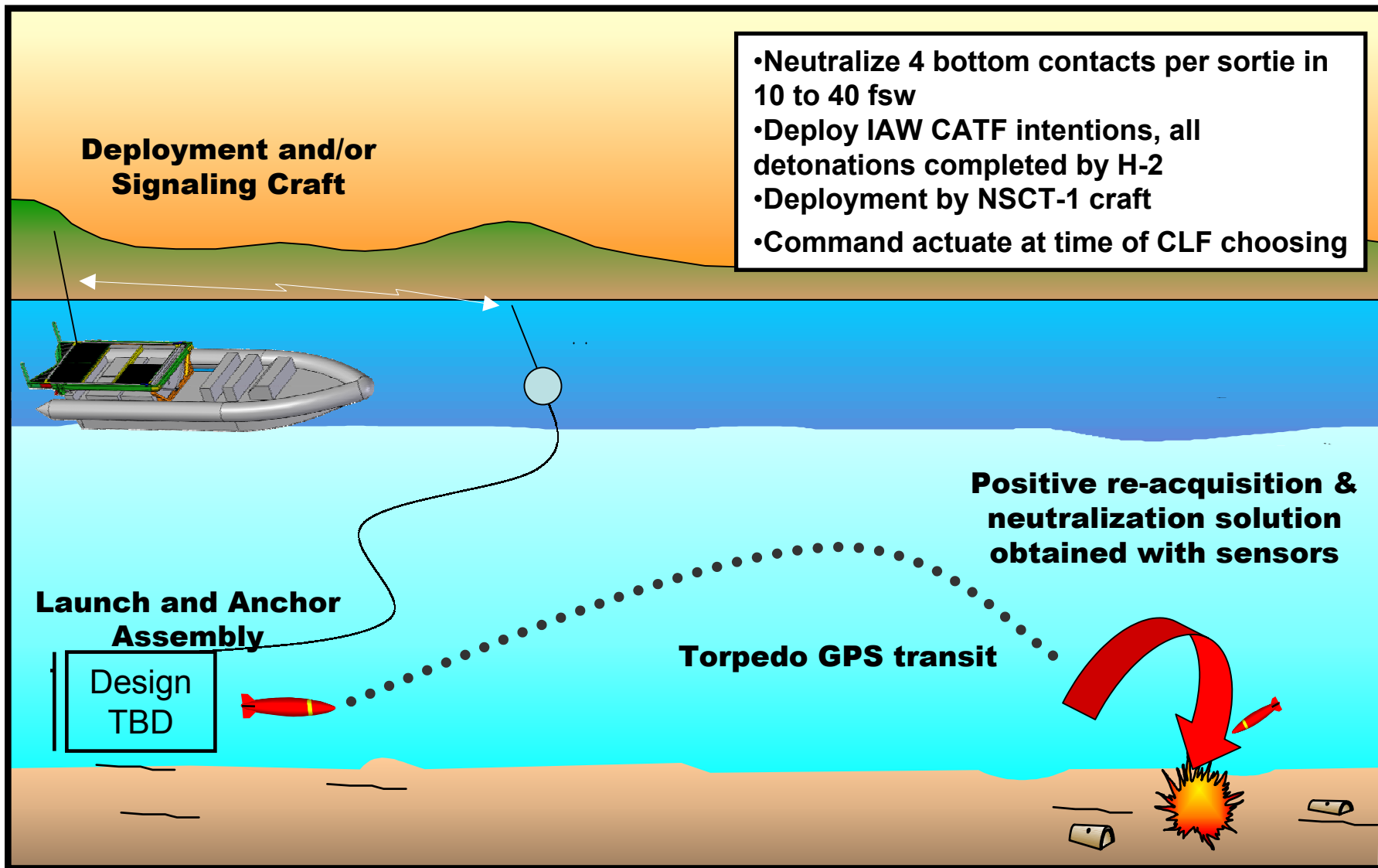
UUV-N Development Spirals

UUV-N Spiral Development Process				
Desired Trend		Spiral 1 (Baseline State) FY 2010	Spiral 2 (Improved State) FY 2012	Spiral 3 (Desired End State) FY 2015
Command & Control System	Increase C&C range commensurate with vehicle range	2000-yd data link with control console	5-nmi wireless data link with LOS control console	
Deployment Standoff & System Range	Increase standoff for operator safety, increase range of neutralizers	CRRC	11-m RHIB	LOS command and control system enables multiple launch-through-destroy sequences within H-2 timeframe.
Deployment Platform	Decrease observability and increase autonomy	500 yd from minefield, 2000 yd from furthest target	≥ 5 nmi from beach and furthest target	
Effectiveness	Add moored targets, higher-density environments, and larger qty/sortie	Bottom or moored targets, (4 total) low-density environment	Bottom or moored targets (4-8 total), low-density environment	Up to 32 rounds (8 bottom, 24 moored) launch, seek targets, confirm target neutralization solution, and detonate to destroy all targets in a given 300x2000-yd lane
Neutralizer Size	Reduce neutralizer size to increase qty/sortie	2 man deployable, & 4 systems must fit into a CRRC	One man deployable	

UUV-N Concept Of Operations



UUV-N MISSION SEQUENCE OVERVIEW





UUV-N Technological Challenge Areas



- Targeting in the VSW
 - Must reacquire targets and provide positive target confirmation & tracking
 - Enhanced sensor suites and software, includes stabilization demands
 - Characterization of VSW hydrodynamic surge environment
- Command & Control and Data Management
 - Must support launch, tracking, maneuvering, targeting, and neutralization sequence; & target verification.
 - Range and bandwidth limitations

Must utilize/leverage existing technology (spiral 1 in FY10)



Weapons Systems Explosives Safety Review Board (WSESRB)



- Structured Weapons review process will take place
- Various Safety issues will be extensively reviewed
 - Stockpile to target sequence
 - Insensitive munitions
 - Hazard of Electromagnetic Radiation to Ordnance (HERO)
 - In-depth design review
- Government will assume responsibility for WSESRB approval
 - Contractor will provided information for approval process
- Explosive material and firing train development is deemed high risk

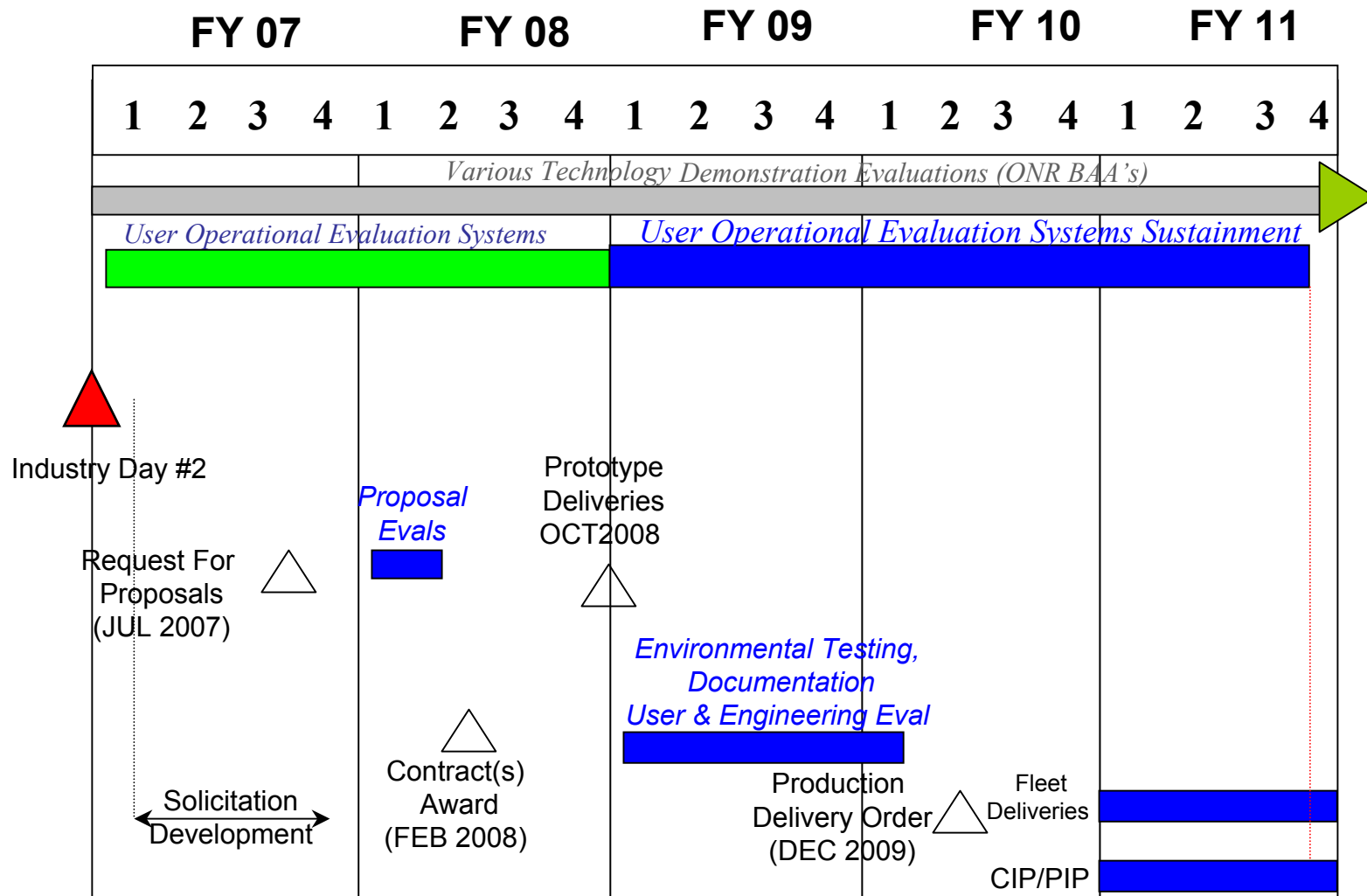
NOTIONAL CONTRACT APPROACH

THREE PHASE APPROACH

- Phase I
 - Submit documentation requested (design/concept, proven technology, experience in supporting like mission area, examples of past work, etc.)
 - Pass or Fail
- Phase II
 - Evaluation
 - Technical Approach
 - Vendor Capability
 - Highly qualified Proceed to next phase
- Phase III
 - Evaluation
 - Hardware Sample & Conversion Plan
 - Technical/Logistic Documentation Sample & Conversion Plan
 - Best overall value is determined
 - Contracts could be awarded to more than 1 vendor



NOTIONAL VSW N-UUV PROGRAM SCHEDULE





CONTRACT HIGHLIGHTS



- Inventory Objective: ~ 200 Neutralizers
- Duration of Contract: 10 years
 - Production
 - Life Cycle Support
 - Engineering Services (PIP/CIP)